Lean Implementation Status Measurement

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Abstract

To compete in a global market, organizations should continuously work on improvement of their processes, operations, and people. Lean management has been recognized as the most influential manufacturing paradigm in history. Lean management is also used as a successful improvement strategy which companies use in order to ensure their competitiveness. There is always a question of the sustainability of the improvement activities and one of the possible ways to sustain the positive results is a continuous measurement. This paper provides an example on how the measure Lean implementation status in a transformer production environment using ProReport tool. The example is based on the data gathered by power transformer factory KPT, one of 22 Siemens facilities all around the world. The baseline for the results was the fiscal year (FY) 2015 (from 01.10.2014. to 30.09.2015).

Keywords: Lean measurement, Končar Power Transformers, ProReport

1. INTRODUCTION

Companies that want to compete in a global market have to be very efficient in creating value for the customers. This means they have to produce products of the desirable quality and acceptable price in a given timeframe. The power transformer industry is a very competitive market, therefore to be able to secure their competitiveness companies have to work on the continuous improvement of their processes. One of the strategies to increase their competitiveness is implementation of Lean production or generally speaking, Lean management. The term Lean production, which stands for Toyota Production System 0, has been popularized in the early nineties by the work of James P. Womack, Daniel T. Jones and Daniel Roos 0. Nowadays, Lean production has been recognized as one of the most influential production paradigms in the history. Lean is not only about clear understanding of Lean basic principles (e.g. value, value stream, flow, pull and perfection), 7 types of waste, sustainable problem solving, value stream mapping, etc. It is about relentlessly searching for the better way to deliver the best products or services to the customers. When implemented Lean production reduces the time between a customer order and delivery by eliminating non-value added activities 0.

When a company starts to implement Lean production, its principles and tools, the question of sustainability of the early positives results raises after some time. One of the strategies that companies use to make all the improvement activities sustainable through the time is to measure their progress. Several maturity models exist on the market as well as tools that help companies measure the progress of Lean. ProReport is one such tool that helps companies structure and report on results and status of the Lean initiatives.

This paper shows one possibility how to measurement Lean status in a company and use it to compare the status within a bigger group. The case study described in the section 2 is based on an example of the use of ProReport in a company Končar Power Transformers (KPT), a joint venture company of Siemens and Končar. KPT's Lean measurement results were also compared to the result of the Lean status of 22 other production factories inside the Siemens Energy group. When KPT started with the use of ProReport it had a clear picture to improve its processes and report score by using the information about their current status as well as the best practices from the other factories in Siemens Energy group. Lean status reporting on a monthly basis gives information for management in a simple and more accurate way. Section 3 reports on results of the Lean status in the FY 2015 for the all 22 factories in the Siemens Energy group.

2. CASE STUDY

In this case study, an example of the Lean measurement in the company Končar Power Transformers is given. Additionally, the results of the Lean measurement from the FY 2015 were reported and compared to the other 22 power transformers facilities inside the Siemens Energy Management.

2.1. Company profile

Over the last five years, the company Končar Power Transformer generated more than 96% of its revenue by exporting products and services to more than ninety countries in the world. KPT's production program includes:

- generator power transformers up to 800 MVA, voltage up to 420 kV
- transmission transformers and autotransformers with rating up to 600 MVA, voltage up to 420 kV
- transmission and distribution transformers with rating up to 2.5 to 100 MVA, voltage up to 170 kV

Figure 1 shows KPT's production program as well as the most important references from the recent years. With many years spent developing employee's personal skills and knowledge, the company continuously increases its intellectual capital and develops its ability to respond to all market challenges in a transparent and sustainable way.

2.2. History of Lean in KPT

Challenges in the global market, such as price reduction of transformers, the rise in prices of materials, increased competition and increased workloads are growing. Therefore, the issue of sustainability of the transformer manufacturing was raised from the top management of KPT. One of the possible answers to sustainability issues is increased efficiency in all company's operations. In 2011, Management board and top management of KPT decided on intensive improvements and significant changes to existing operations. Employees were called to accept and actively support upcoming activities and behavior changes.

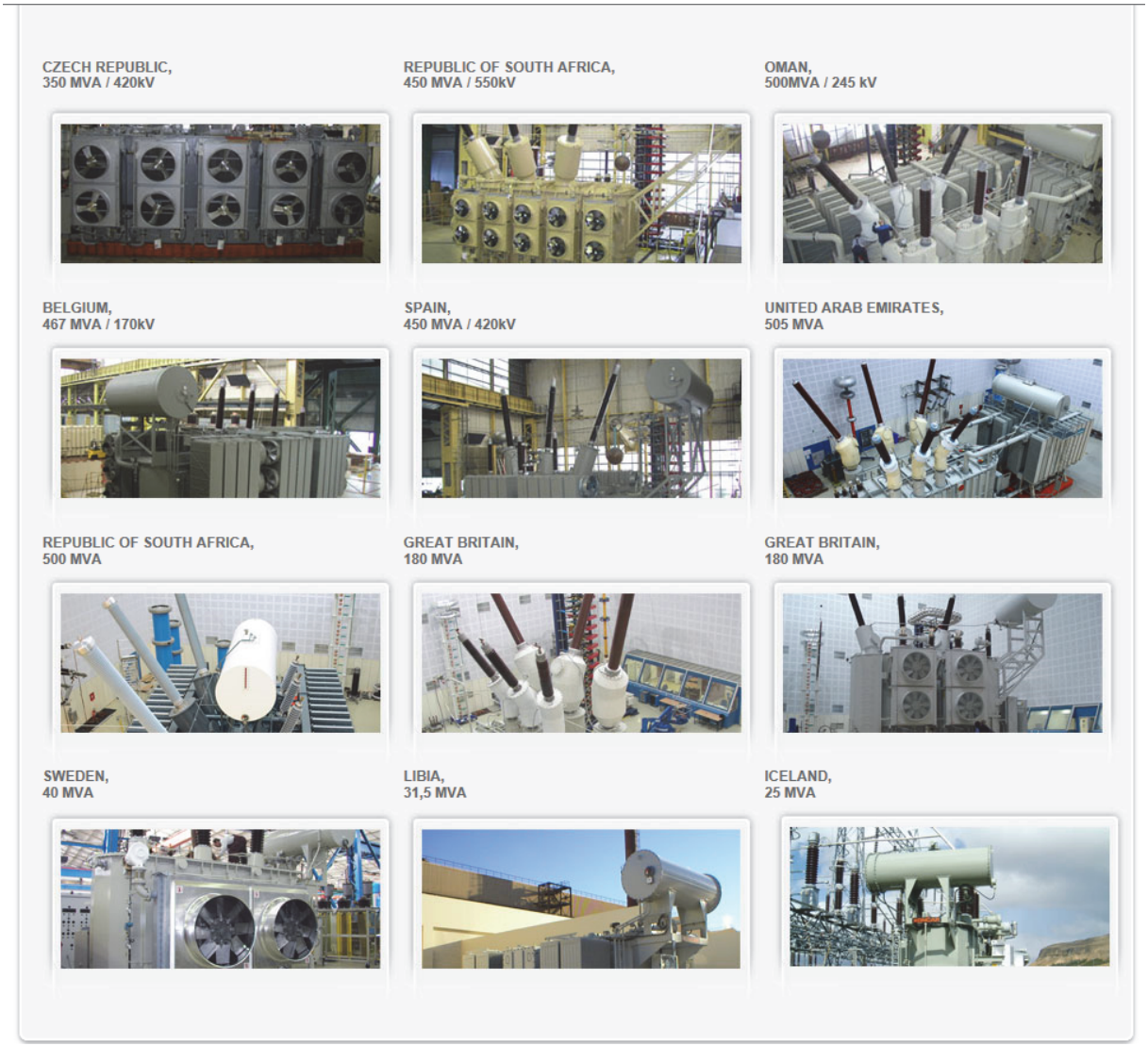

Figure 1 – The biggest power transformer references in the last few years 0

Comprehensive project "SVE5 – **S**ustav **V**isoke **E**fikasnosti **P**rocesa **E**nergetskih **T**ransformatora", (System of high efficiency power transformers processes), was initiated. SVE5 project has been based on the application of Lean philosophy and culture in all company's operations. Lean business management method is primarily investment in people. SVE5 project included implementation of methods and tools such as value flow analysis and process mapping, implementation of proposed improvements and reward system.

In the next step, Energy Top+ initiative was established. Energy Top+ requests the reporting of standardized data about the Lean status of all business units in Siemens Energy supplies using the ProReport on a monthly basis. This report consists of a standardized template and instructions for every organization. Templates and additional instructions for the operational reporting were provided by Business Excellence (BE) department.

2.3. ProReport

ProReport is a level assessment that shows how company's current Lean implementation process is compared to other Siemens transformer factories and world class organizations. ProReport is therefore used to:

- review the implementation process
- review the available basic principles and action areas
- carefully check the need for additional ones (principles and action areas)
- review the training processes
- identify additional needs for competence management

For an organization to be able to compare its Lean initiatives to the others it has to follow standardized Lean implementation plan (LIP). KPT Lean implementation plan is given in Figure 2.

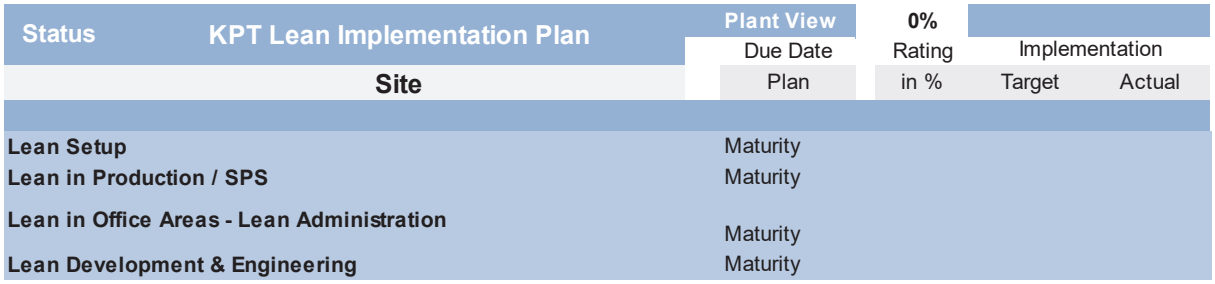

Figure 2 – ProReport overview

Figure 2 shows major fields of the Lean implementation plan. These fields are: Lean Setup, Lean in Production / SPS, Lean in Office Areas – Lean Administration and Lean Development & Engineering. LIP covers Lean transformation across the whole company including production, administration, development and engineering areas. This is due to the fact that a successful lean implementation means involving the entire organization, from the top-management to the shop-floor employees.

Main part of the LIP is a Lean Setup (Figure 3) that among other things measures the understanding of the Lean management among employees, availability of the specific Lean knowledge as well as the presence of long-term strategic thinking and planning.

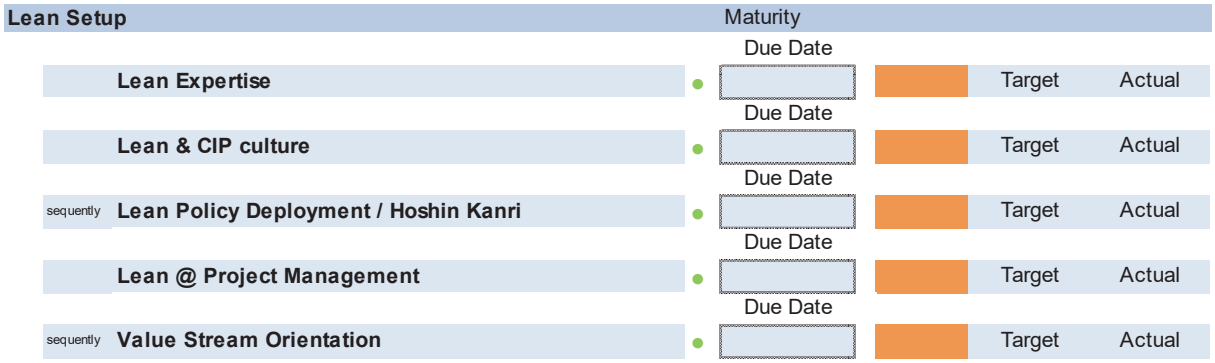

Figure 3 – ProReport Lean Setup overview

Figure 3 shows major fields of Lean setup measurement plan inside the LIP: Lean Expertise, Lean & CIP culture, Lean Policy Deployment / Hoshin Kanri, Lean @ Project Management and Value Stream Orientation. The central point of the LIP system presents measures of Lean in Production.

2.4. LIP results for the FY 2015

As mentioned above, Lean measures serve as a tool to compare company's results to the results of the companies in the same group but as well to the results of the best in class companies. In FY 2015, KPT has conducted LIP assessment and the results of their measurement were compared to other companies in the group. Figure 4 shows the summarized results of the Lean implementation plan. KPT achieved score of 26 %.

Status	Lean Implementation Plan	Plant View	26%		
		Due Date	Rating	Implementation	
01.10.2015.	Site	Plan	in %	Target	Actual
Lean Setup		Maturity	53%		
Lean in Production / SPS		Maturity	40%		
Lean in Office Areas - Lean Administration		Maturity	11%		
Lean Development & Engineering		Maturity	0%		

Figure 4 – ProReport results for the KPT in FY 2015

An example of the Lean measurement in the field of Lean Setup is given in Figure 5. When measuring the Lean expertise in a company, a first step is to assess the Lean awareness at all management levels. Then Lean basic / CIP training for all employees whereas a min. 4 hours of training content for all employees has to be achieved. Every company has to recognize the Lean skills of their employees and present them in a Qualification matrix including a competency rating and training plans that have to be fully implemented and regularly updated. Hoshin Kanri Workshop with Senior Management Team need to be conducted and the strategy is defined and described in a Vision & Strategy roadmap or X-Matrix.

01.10.2015.	Site	Plan	in %	Target	Actual
Lean Setup		Maturity	53%		
		Due Date			
	Lean Expertise	Sep. 17	44%	Target	Actual
		Due Date			
	Lean & CIP culture	Sep. 16	69%	Target	Actual
		Due Date			
sequently	Lean Policy Deployment / Hoshin Kanri	Oct. 15	83%	Target	Actual
		Due Date			
	Lean @ Project Management	Sep. 16	25%	Target	Actual
		Due Date			
sequently	Value Stream Orientation	Sep. 16	43%	Target	Actual

Figure 5 – Lean Expertise results for the KPT in FY 2015

As mentioned earlier, the results of every factory inside the Siemens Energy group are compared at the end of the FY to the results of the Lean measurement assessment of all other factories.

Figure 6 shows the result from the FY 2015 of Lean status measurement in all 22 Siemens transformer factories (including KPT). As it can be seen from the same figure, the results are in the range from 11 % up to 47 %. KPT has achieved LIP level of 26 % (as shown in Figure 4) and with this result, it is in the middle compared to other factories. These results give KPT a solid basis to understand its current position on the never-ending Lean journey.

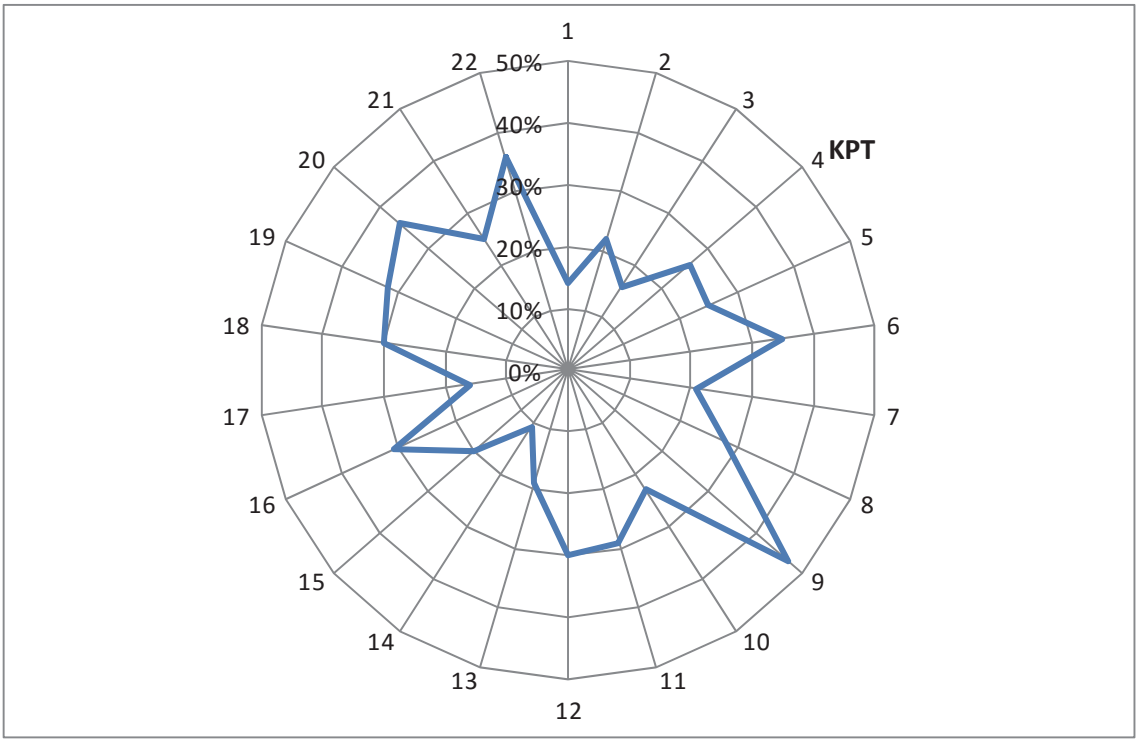

Figure 6 – ProReport LIP results for FY 2015

Results shown in Figure 6 give KPT direction for the improvement of the current ratio, thus, the management needs to focus on various strategies including its current liabilities and improvement initiatives. Lean management improvements are certainly not a onetime activity, therefore, they have to be monitored throughout the year.

3. CONCLUSION

Compared to the traditional business systems, lean creates processes that need less human effort, less space, less capita and less time to make products and services at far less cost and with much fewer defects by eliminating waste along entire value streams, instead of at isolated points.

Lean status reporting on a monthly basis gives information to the management in a simpler and more accurate way thus the management can define action needed to improve current status.

KPT has a clear picture of its position according to the LIP status inside the Siemens transformer's facilities and can improve this position by using best practices from other location. Becoming and remaining lean is a never ending journey therefore continuous improvement and never-ending striving for excellence is a key to stay competitive on the global market.

4. REFERENCES

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